UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/071,980	02/06/2002	Andrew L. Norrell	PA1634US	1577

7590 06/15/2005

Jim H. Salter
Blakely, Sokoloff, Taylor, and Zafman LLP
1279 Oakmead Parkway
Sunnyvale, CA 94085

EXAMINER	
TORRES, JUAN A	

ART UNIT	PAPER NUMBER
2631	

DATE MAILED: 06/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/071,980	NORRELL ET AL.	
	Examiner	Art Unit	
	Juan A. Torres	2631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-49* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 February 2002* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The abstract of the disclosure is objected to because: in line 1 of the abstract the recitation "DSL network" is improper; it is suggested to be changed to "Digital Subscriber Line (DSL) network".

Correction is required. See MPEP § 608.01(b).

The disclosure is objected to because of the following informalities:

a) In page 1 paragraph [0001] the recitation "US Patent Application No. ____ file on ____ and entitled "Loop Extender with Selectable Line Termination and Equalization" is improper; it is suggested to be changed to "US Patent Application No. 10,071,980 file on February 6, 2002 and entitled "Loop Extender with Selectable Line Termination and Equalization".

b) In page 1 paragraph [0001] the recitation "US Patent Application No. ____ file on ____ and entitled "Line Powered Loop Extender with Communications, Control and Diagnostics" is improper; it is suggested to be changed to "US Patent Application No. 10,072,833 file on February 6, 2002 and entitled "Loop Extender with Selectable Line Termination and Equalization".

Appropriate correction is required.

Claim Objections

Claim 1 objected to because of the following informalities: the recitation in line 1 of claim 1 "DSL signals" is improper; it is suggested to be changed to "Digital Subscriber Line (DSL) signals". Appropriate correction is required.

Claim 14 objected to because of the following informalities: the recitation in line 3 of claim 5 "POTS loading coils" is improper; it is suggested to be changed to "Plain Old Telephone Service (POTS) loading coils". Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 7, 24 and 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Tambe (US 20020113649 A1).

As per claim 1 Tambe discloses a system for improving transmission of DSL signals, the system comprising a plurality of loop extenders coupled to a plurality of local loops for amplifying upstream and downstream DSL signals transmitted over the plurality of local loops (figures 4 and 5 page 4 paragraphs [0043] to [0044]); a central office controller/power supply coupled to a first local loop of the plurality of local loops and coupled to a second local loop of the plurality of local loops for providing power to the first local loop and the second local loop (pages 4-5 paragraph [0049] to [0052]); and a loop extender communications/power supply coupled to the central office controller/power supply via the first local loop and the second local loop for receiving power via the first local loop and the second local loop, and coupled to the plurality of loop extenders for providing power to the plurality of loop extenders (figures 4 and 5 pages 4-5 paragraphs [0043] to [0052]).

As per claim 7 Tambe discloses that the central office controller/power supply includes a first modem for communication with the plurality of loop extenders, a processor coupled to the first modem, and loop extender management software executable by the processor for generating control signals; and the loop extender communications/power supply includes a second modem for communication with the central office controller/power supply (figures 4 and 5 pages 4-5 paragraphs [0043] to [0052]).

As per claim 24 Tambe discloses a method for improving transmission of DSL signals, the method comprising the steps of amplifying upstream and downstream DSL signals transmitted over a plurality of local loops via a plurality of loop extenders

coupled to the plurality of local loops (figures 4 and 5 page 4 paragraphs [0043] to [0044]); providing power to a loop extender communications/power supply via a first local loop of the plurality of local loops and via a second local loop of the plurality of local loops for providing power to the plurality of loop extenders (pages 4-5 paragraph [0049] to [0052]); sending control signals to a loop extender communications/power supply via the first local loop and via the second local loop, receiving the control signals, and broadcasting the control signals to the plurality of loop extenders (figures 4 and 5 pages 4-5 paragraphs [0043] to [0052]).

As per claim 25 Tambe discloses that the control signals are broadcast in a voice-frequency band (page 1 paragraph [0008]).

Claims 1, 7 and 24-36 are rejected under 35 U.S.C. 102(e) as being anticipated by Shenoi (US 6507606).

As per claim 1 Shenoi discloses a system for improving transmission of DSL signals, the system comprising a plurality of loop extenders coupled to a plurality of local loops for amplifying upstream and downstream DSL signals transmitted over the plurality of local loops (figures 4 and 5 column 7 line 48 to column 8 line 46); a central office controller/power supply coupled to a first local loop of the plurality of local loops and coupled to a second local loop of the plurality of local loops for providing power to the first local loop and the second local loop (column 8 line 49 to column 9 line 10); and a loop extender communications/power supply coupled to the central office controller/power supply via the first local loop and the second local loop for receiving power via the first local loop and the second local loop, and coupled to the plurality of

loop extenders for providing power to the plurality of loop extenders (figures 4 and 5 column 7 line 48 to column 9 line 10).

As per claim 7 Shenoi discloses that the central office controller/power supply includes a first modem for communication with the plurality of loop extenders, a processor coupled to the first modem, and loop extender management software executable by the processor for generating control signals; and the loop extender communications/power supply includes a second modem for communication with the central office controller/power supply (figures 4 and 5 column 7 line 48 to column 9 line 10).

As per claim 24 Shenoi discloses a method for improving transmission of DSL signals, the method comprising the steps of amplifying upstream and downstream DSL signals transmitted over a plurality of local loops via a plurality of loop extenders coupled to the plurality of local loops (figures 4 and 5 column 7 line 48 to column 8 line 46); providing power to a loop extender communications/power supply via a first local loop of the plurality of local loops and via a second local loop of the plurality of local loops for providing power to the plurality of loop extenders (column 8 line 49 to column 9 line 10); sending control signals to a loop extender communications/power supply via the first local loop and via the second local loop, receiving the control signals, and broadcasting the control signals to the plurality of loop extenders (figures 4 and 5 column 7 line 48 to column 9 line 10).

As per claim 25 Shenoi discloses that the control signals are broadcast in a voice-frequency band (column 1 lines 48-60).

As per claim 26 Shenoi discloses that each loop extender, upon receiving a broadcast control signal, samples DSL signals (figure 5 column 9 line 46 to column 10 line 22).

As per claim 27 Shenoi inherently discloses that each loop extender processes the sampled DSL signals to compute average power (figures 12 and 13, column 8 lines 57-67 and column 17 lines 46 to 60. The calculation of the average power is inherently in the calculation of the spectral density and power control).

As per claim 28 Shenoi inherently discloses that each loop extender processes the sampled DSL signals to compute peak power (figures 12 and 13, column 8 lines 57-67 and column 17 lines 46 to 60. The calculation of the peak power is inherently in the calculation of the spectral density and power control).

As per claim 29 Shenoi inherently discloses that each loop extender processes the sampled DSL signals to compute root-mean-square power (figures 12 and 13, column 8 lines 57-67 and column 17 lines 46 to 60. The calculation of the root-mean-square (rms) power is inherently in the calculation of the spectral density and power control).

As per claim 30 Shenoi discloses that each loop extender processes the sampled DSL signals to compute power spectral density (figures 12 and 13, column 8 lines 57-67 and column 17 lines 46 to 60).

As per claim 31 Shenoi discloses the step of amplifying upstream and downstream DSL signals via DSL amplification circuitry (figure 4 column 7 line 64 to column 8 line 14).

As per claim 32 Shenoi inherently discloses that each loop extender, upon receiving a broadcast control signal, uncouples the DSL amplification circuitry from the local loop (column 8 line 57 to column 9 line 35).

As per claim 33 Shenoi inherently discloses that each loop extender, upon receiving a broadcast control signal, couples the DSL amplification circuitry to the local loop (column 8 line 57 to column 9 line 35).

As per claim 34 Shenoi inherently discloses that wherein each loop extender, upon receiving a broadcast control signal, selects switch states of the DSL amplification circuitry according to the broadcast control signal for improving performance of the DSL amplification circuitry (column 8 line 57 to column 9 line 35).

As per claim 35 Shenoi inherently discloses that each loop extender, upon receiving a broadcast control signal, samples the DSL signals and selects switch states of the DSL amplification circuitry according to the sampled DSL signals for improving performance of the DSL amplification circuitry (column 8 line 57 to column 9 line 35).

As per claim 36 Shenoi discloses a system for improving transmission of DSL signals, the system comprising means for transmitting DSL signals (column 1 lines 48-60 and column 1 line 61 to column 2 line 11); means for amplifying the transmitted DSL signals (figure 4 column 7 line 64 to column 8 line 14); first means for providing power to the means for amplifying (column 8 lines 57-67); second means for providing power via the means for transmitting DSL signals to the first means for providing power (column 8 lines 57-67); means for controlling the means for amplifying to improve performance of the means for amplifying (column 8 lines 57-67); means for broadcasting to the means

for controlling (column 1 lines 48-60 and column 1 line 61 to column 2 line 11); means for generating control signals (column 8 lines 57-67 and column 17 line 61 to column 18 line 3); means for sending the control signals via the means for transmitting DSL signals to the means for broadcasting (column 1 lines 48-60 and column 1 line 61 to column 2 line 11).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2-6 and 8-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tambe (US 20020113649 A1) as applied to claim 1 above, and further in view of Hurst (US 5422929).

As per claim 2 Tambe discloses claim 1. Tambe doesn't disclose that the central office controller/power supply is coupled to the first local loop via a first transformer and coupled to the second local loop via a second transformer. It is very well known and Hurst discloses that the central office controller/power supply is coupled to the first local loop via a first transformer and coupled to the second local loop via a second transformer (figure 2 column 4 lines 53-65). Tambe and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the lop extender disclosed by Tambe with the coupled transformers disclosed by Hurst. The

suggestion/motivation for doing so would have been to provide minimum operating power loss with maximum power transfer between the automatic gain repeater circuit and subscriber loop while maintaining adequate transhybrid loss between the two directions of transmission and matching input impedance. Therefore, it would have been obvious to combine Tambe with Hurst to obtain the invention as specified in claim 2.

As per claim 3 Tambe and Hurst disclose claim 2. Hurst discloses that the central office controller/power supply includes a central office power supply, a positive node of the central office power supply being inductively coupled to a center tap of the first transformer and a negative node of the central office power supply being inductively coupled to a center tap of the second transformer (figure 2 and figure 4 column 8 line 61 to column 9 line 8). Tambe and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the lop extender disclosed by Tambe with the coupled transformers disclosed by Hurst. The suggestion/motivation for doing so would have been to provide minimum operating power loss with maximum power transfer between the automatic gain repeater circuit and subscriber loop while maintaining adequate transhybrid loss between the two directions of transmission and matching input impedance. Therefore, it would have been obvious to combine Tambe with Hurst to obtain the invention as specified in claim 3.

As per claim 4 Tambe discloses claim 1. Tambe doesn't disclose that the loop extender communications/power supply is coupled to the first local loop via a third transformer and coupled to the second local loop via a fourth transformer. It is very well

known and Hurst discloses the loop extender communications/power supply is coupled to the first local loop via a third transformer and coupled to the second local loop via a fourth transformer (figure 2 column 4 lines 53-65). Tambe and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the lop extender disclosed by Tambe with the coupled transformers disclosed by Hurst. The suggestion/motivation for doing so would have been to provide minimum operating power loss with maximum power transfer between the automatic gain repeater circuit and subscriber loop while maintaining adequate transhybrid loss between the two directions of transmission and matching input impedance. Therefore, it would have been obvious to combine Tambe with Hurst to obtain the invention as specified in claim 4.

As per claim 5 Tambe and Hurst disclose claim 4. Hurst discloses that the loop extender communications/power supply includes a loop extender power supply, a positive node of the loop extender power supply being inductively coupled to a center tap of the third transformer and a negative node of the loop extender power supply being inductively coupled to a center tap of the fourth transformer (figure 2 and figure 4 column 8 line 61 to column 9 line 8). Tambe and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the lop extender disclosed by Tambe with the coupled transformers disclosed by Hurst. The suggestion/motivation for doing so would have been to provide minimum operating power loss with maximum power transfer between the automatic gain repeater circuit and subscriber loop while

maintaining adequate transhybrid loss between the two directions of transmission and matching input impedance. Therefore, it would have been obvious to combine Tambe with Hurst to obtain the invention as specified in claim 5.

As per claim 6 Tambe and Hurst disclose claim 5. Tambe discloses that the loop extender power supply is coupled to the plurality of loop extenders for providing power to the plurality of loop extenders (figures 4 and 5 pages 4-5 paragraphs [0043] to [0052]). Tambe and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the lop extender disclosed by Tambe with the coupled transformers disclosed by Hurst. The suggestion/motivation for doing so would have been to provide minimum operating power loss with maximum power transfer between the automatic gain repeater circuit and subscriber loop while maintaining adequate transhybrid loss between the two directions of transmission and matching input impedance. Therefore, it would have been obvious to combine Tambe with Hurst to obtain the invention as specified in claim 6.

As per claim 8 Tambe discloses claim 7. Tambe doesn't disclose that the first modem is coupled to the first local loop via a first transformer and coupled to the second local loop via a second transformer, and the second modem is coupled to the first local loop via a third transformer and coupled to the second local loop via a fourth transformer. It is very well known and Hurst discloses that the first modem is coupled to the first local loop via a first transformer and coupled to the second local loop via a second transformer, and the second modem is coupled to the first local loop via a third

transformer and coupled to the second local loop via a fourth transformer (figure 2 column 4 lines 53-65). Tambe and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the lop extender disclosed by Tambe with the coupled transformers disclosed by Hurst. The suggestion/motivation for doing so would have been to provide minimum operating power loss with maximum power transfer between the automatic gain repeater circuit and subscriber loop while maintaining adequate transhybrid loss between the two directions of transmission and matching input impedance. Therefore, it would have been obvious to combine Tambe with Hurst to obtain the invention as specified in claim 8.

As per claim 9 Tambe and Hurst disclose claim 8. Tambe discloses that the first modem is coupled to a center tap of the first transformer via a first capacitor and coupled to a center tap of the second transformer via a second capacitor, and the second modem is coupled to a center tap of the third transformer via a third capacitor and coupled to a center tap of the fourth transformer via a fourth capacitor (figure 6 pages 5-6 paragraphs [0059] to [0062]). Tambe and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the lop extender disclosed by Tambe with the coupled transformers disclosed by Hurst. The suggestion/motivation for doing so would have been to provide minimum operating power loss with maximum power transfer between the automatic gain repeater circuit and subscriber loop while maintaining adequate transhybrid loss between the two

directions of transmission and matching input impedance. Therefore, it would have been obvious to combine Tambe with Hurst to obtain the invention as specified in claim 9.

As per claim 10 Tambe and Hurst disclose claim 9. Hurst discloses a transformer couples the first capacitor and the second capacitor to the first modem, and a transformer couples the third capacitor and the fourth capacitor to the second modem. (figure 2 column 4 lines 53-65). Tambe and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the lop extender disclosed by Tambe with the coupled transformers disclosed by Hurst. The suggestion/motivation for doing so would have been to provide minimum operating power loss with maximum power transfer between the automatic gain repeater circuit and subscriber loop while maintaining adequate transhybrid loss between the two directions of transmission and matching input impedance. Therefore, it would have been obvious to combine Tambe with Hurst to obtain the invention as specified in claim 10.

As per claim 11 Tambe and Hurst disclose claim 10. Tambe discloses that the first modem and the second modem communicate in a voice-frequency band (page 1 paragraph [0008]). Tambe and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the lop extender disclosed by Tambe with the coupled transformers disclosed by Hurst. The suggestion/motivation for doing so would have been to provide minimum operating power loss with maximum power transfer between the automatic gain repeater circuit and subscriber loop while maintaining

adequate transhybrid loss between the two directions of transmission and matching input impedance. Therefore, it would have been obvious to combine Tambe with Hurst to obtain the invention as specified in claim 11.

As per claim 12 Tambe and Hurst disclose claim 8. Tambe discloses that the processor sends the control signals to the first modem for transmission over the first local loop and the second local loop (figures 4 and 5 pages 4-5 paragraphs [0043] to [0052]). Tambe and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the lop extender disclosed by Tambe with the coupled transformers disclosed by Hurst. The suggestion/motivation for doing so would have been to provide minimum operating power loss with maximum power transfer between the automatic gain repeater circuit and subscriber loop while maintaining adequate transhybrid loss between the two directions of transmission and matching input impedance. Therefore, it would have been obvious to combine Tambe with Hurst to obtain the invention as specified in claim 12.

As per claim 13 Tambe and Hurst disclose claim 12. Tambe discloses that the second modem receives the control signals and broadcasts the received control signals to the plurality of loop extenders via the plurality of local loops (figures 4 and 5 pages 4-5 paragraphs [0043] to [0052]). Tambe and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the lop extender disclosed by Tambe with the coupled transformers disclosed by Hurst. The suggestion/motivation

for doing so would have been to provide minimum operating power loss with maximum power transfer between the automatic gain repeater circuit and subscriber loop while maintaining adequate transhybrid loss between the two directions of transmission and matching input impedance. Therefore, it would have been obvious to combine Tambe with Hurst to obtain the invention as specified in claim 13.

As per claim 14 Tambe and Hurst disclose claim 13. Tambe discloses that each loop extender of the plurality of loop extenders includes a POTS loading coils coupled to a local loop of the plurality of local loops (figures 4 and 5 pages 4-5 paragraphs [0043] to [0052]); DSL amplification circuitry coupled to the local loop via bypass switches (figures 4 and 5 pages 4-5 paragraphs [0043] to [0052]); an analog multiplexer/analog-to-digital converter (AMADC) coupled to the DSL amplification circuitry via diagnostic lines and control lines for sampling DSL signals via the diagnostic lines and controlling the DSL amplification circuitry via the control lines (figures 2 and 3 pages 3-4 paragraphs [0036] to [0042]); and a diagnostic/control processor (DCP) coupled to the local loop and the AMADC for processing the control signals received via the local loop and processing the sampled DSL signals from the AMADC (figures 4 and 5 pages 4-5 paragraphs [0043] to [0052]). Tambe and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the lop extender disclosed by Tambe with the coupled transformers disclosed by Hurst. The suggestion/motivation for doing so would have been to provide minimum operating power loss with maximum power transfer between the automatic gain repeater circuit and subscriber loop while

maintaining adequate transhybrid loss between the two directions of transmission and matching input impedance. Therefore, it would have been obvious to combine Tambe with Hurst to obtain the invention as specified in claim 14.

Claims 37-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shenoi (US 6507606) and further in view of Hurst (US 5422929).

As per claim 37 Shenoi discloses a system for improving transmission of DSL signals, the system comprising a plurality of local loops, including a first local loop for transmitting control signals and power, and a second local loop for transmitting control signals and power (column 8 line 49 to column 9 line 10); a plurality of loop extenders for amplifying DSL signals, coupled to the plurality of local loops, each loop extender including a POTS loading coils coupled to a local loop from the plurality of local loops, DSL amplification circuitry coupled to the local loop via bypass switches, an AMADC coupled to the DSL amplification circuitry via diagnostic lines and control lines, for sampling DSL signals via the diagnostic lines and controlling the DSL amplification circuitry via the control lines, and a DCP coupled to the local loop and the AMADC for processing the control signals received via the local loop and processing the sampled DSL signals received via the AMADC (figures 4 and 5 column 7 line 48 to column 9 line 10); a loop extender communications/power supply coupling the first local loop and the second local loop to the plurality of loop extenders for providing power and broadcasting the control signals to the plurality of loop extenders, the loop extender communications/power supply including a second modem for communication with the plurality of loop extenders (figures 4 and 5 column 7 line 48 to column 9 line 10); and a

central office controller/power supply coupled to the first local loop and coupled to the second local loop for providing power to the loop extender communications/power supply, generating the control signals, and sending the control signals to the loop extender communications/power supply, the central office controller/power supply including a first modem for communication with the loop extender communications/power supply, a processor coupled to the first modem, and loop extender management software executable by the processor for generating the control signals (column 8 line 49 to column 9 line 10). Shenoi doesn't disclose a first transformer and a second transformer. It is very well known and Hurst discloses that the central office controller/power supply is coupled to the first local loop via a first transformer and coupled to the second local loop via a second transformer (figure 2 column 4 lines 53-65). Shenoi and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the lop extender disclosed by Shenoi with the coupled transformers disclosed by Hurst. The suggestion/motivation for doing so would have been to provide minimum operating power loss with maximum power transfer between the automatic gain repeater circuit and subscriber loop while maintaining adequate transhybrid loss between the two directions of transmission and matching input impedance. Therefore, it would have been obvious to combine Shenoi with Hurst to obtain the invention as specified in claim 37.

As per claim 38 Shenoi and Hurst disclose claim 37. Shenoi discloses that the first modem and the second modem communicate in a voice-frequency band (column 1

lines 48-60). Shenoi and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the lop extender disclosed by Shenoi with the coupled transformers disclosed by Hurst. The suggestion/motivation for doing so would have been to provide minimum operating power loss with maximum power transfer between the automatic gain repeater circuit and subscriber loop while maintaining adequate transhybrid loss between the two directions of transmission and matching input impedance. Therefore, it would have been obvious to combine Shenoi with Hurst to obtain the invention as specified in claim 38.

As per claim 39 Shenoi and Hurst disclose claim 38. Shenoi discloses that the processor sends the control signals to the first modem for transmission over the first local loop and the second local loop (column 8 line 49 to column 9 line 10). Shenoi and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the lop extender disclosed by Shenoi with the coupled transformers disclosed by Hurst. The suggestion/motivation for doing so would have been to provide minimum operating power loss with maximum power transfer between the automatic gain repeater circuit and subscriber loop while maintaining adequate transhybrid loss between the two directions of transmission and matching input impedance. Therefore, it would have been obvious to combine Shenoi with Hurst to obtain the invention as specified in claim 39.

As per claim 40 Shenoi and Hurst disclose claim 39. Shenoi discloses that the second modem receives the control signals and broadcasts the received control signals to the plurality of loop extenders via the plurality of local loops (column 8 line 49 to column 9 line 10). Shenoi and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the lop extender disclosed by Shenoi with the coupled transformers disclosed by Hurst. The suggestion/motivation for doing so would have been to provide minimum operating power loss with maximum power transfer between the automatic gain repeater circuit and subscriber loop while maintaining adequate transhybrid loss between the two directions of transmission and matching input impedance. Therefore, it would have been obvious to combine Shenoi with Hurst to obtain the invention as specified in claim 40.

As per claim 41 Shenoi and Hurst disclose claim 40. Shenoi inherently discloses that the sampled DSL signals to compute average power (figures 12 and 13, column 8 lines 57-67 and column 17 lines 46 to 60. The calculation of the average power is inherently in the calculation of the spectral density and power control). Shenoi and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the lop extender disclosed by Shenoi with the coupled transformers disclosed by Hurst. The suggestion/motivation for doing so would have been to provide minimum operating power loss with maximum power transfer between the automatic gain repeater circuit and subscriber loop while maintaining adequate transhybrid loss

between the two directions of transmission and matching input impedance. Therefore, it would have been obvious to combine Shenoi with Hurst to obtain the invention as specified in claim 41.

As per claim 42 Shenoi and Hurst disclose claim 40. Shenoi inherently discloses that the DCP processes the sampled DSL signals to compute peak power (figures 12 and 13, column 8 lines 57-67 and column 17 lines 46 to 60. The calculation of the peak power is inherently in the calculation of the spectral density and power control). Shenoi and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the lop extender disclosed by Shenoi with the coupled transformers disclosed by Hurst. The suggestion/motivation for doing so would have been to provide minimum operating power loss with maximum power transfer between the automatic gain repeater circuit and subscriber loop while maintaining adequate transhybrid loss between the two directions of transmission and matching input impedance. Therefore, it would have been obvious to combine Shenoi with Hurst to obtain the invention as specified in claim 42.

As per claim 43 Shenoi and Hurst disclose claim 40. Shenoi inherently discloses that the sampled DSL signals to compute root-mean-square power (figures 12 and 13, column 8 lines 57-67 and column 17 lines 46 to 60. The calculation of the root-mean-square (rms) power is inherently in the calculation of the spectral density and power control). Shenoi and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of

ordinary skill in the art to supplement the lop extender disclosed by Shenoi with the coupled transformers disclosed by Hurst. The suggestion/motivation for doing so would have been to provide minimum operating power loss with maximum power transfer between the automatic gain repeater circuit and subscriber loop while maintaining adequate transhybrid loss between the two directions of transmission and matching input impedance. Therefore, it would have been obvious to combine Shenoi with Hurst to obtain the invention as specified in claim 43.

As per claim 44 Shenoi and Hurst disclose claim 40. Shenoi discloses that the DCP processes the sampled DSL signals to compute power spectral density (figures 12 and 13, column 8 lines 57-67 and column 17 lines 46 to 60). Shenoi and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the lop extender disclosed by Shenoi with the coupled transformers disclosed by Hurst. The suggestion/motivation for doing so would have been to provide minimum operating power loss with maximum power transfer between the automatic gain repeater circuit and subscriber loop while maintaining adequate transhybrid loss between the two directions of transmission and matching input impedance. Therefore, it would have been obvious to combine Shenoi with Hurst to obtain the invention as specified in claim 44.

As per claim 45 Shenoi and Hurst disclose claim 40. Shenoi inherently discloses that each loop extender further includes a bypass relay for coupling the DCP to the bypass switches (column 8 line 57 to column 9 line 35). Shenoi and Hurst are

analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the lop extender disclosed by Shenoi with the coupled transformers disclosed by Hurst. The suggestion/motivation for doing so would have been to provide minimum operating power loss with maximum power transfer between the automatic gain repeater circuit and subscriber loop while maintaining adequate transhybrid loss between the two directions of transmission and matching input impedance. Therefore, it would have been obvious to combine Shenoi with Hurst to obtain the invention as specified in claim 45.

As per claim 46 Shenoi and Hurst disclose claim 45. Shenoi inherently discloses that the DCP, upon receiving control signals, uncouples the DSL amplification circuitry from the local loop by activating a deactivated bypass relay (column 8 line 57 to column 9 line 35). Shenoi and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the lop extender disclosed by Shenoi with the coupled transformers disclosed by Hurst. The suggestion/motivation for doing so would have been to provide minimum operating power loss with maximum power transfer between the automatic gain repeater circuit and subscriber loop while maintaining adequate transhybrid loss between the two directions of transmission and matching input impedance. Therefore, it would have been obvious to combine Shenoi with Hurst to obtain the invention as specified in claim 46.

As per claim 47 Shenoi and Hurst disclose claim 45. Shenoi inherently discloses that the DCP, upon receiving control signals, couples the DSL amplification circuitry to the local loop by deactivating an activated bypass relay (column 8 line 57 to column 9 line 35). Shenoi and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the lop extender disclosed by Shenoi with the coupled transformers disclosed by Hurst. The suggestion/motivation for doing so would have been to provide minimum operating power loss with maximum power transfer between the automatic gain repeater circuit and subscriber loop while maintaining adequate transhybrid loss between the two directions of transmission and matching input impedance. Therefore, it would have been obvious to combine Shenoi with Hurst to obtain the invention as specified in claim 47.

As per claim 48 Shenoi and Hurst disclose claim 40. Shenoi discloses processing the control signals to select the DSL amplification circuitry for improving performance of the DSL amplification circuitry (column 8 line 57 to column 9 line 35). Shenoi and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the lop extender disclosed by Shenoi with the coupled transformers disclosed by Hurst. The suggestion/motivation for doing so would have been to provide minimum operating power loss with maximum power transfer between the automatic gain repeater circuit and subscriber loop while maintaining adequate transhybrid loss between the two directions of transmission and matching input

impedance. Therefore, it would have been obvious to combine Shenoi with Hurst to obtain the invention as specified in claim 48.

As per claim 49 Shenoi and Hurst disclose claim 40. Shenoi discloses processing the sampled DSL signals to select the DSL amplification circuitry for improving performance of the DSL amplification circuitry (column 8 line 57 to column 9 line 35). Shenoi and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the lop extender disclosed by Shenoi with the coupled transformers disclosed by Hurst. The suggestion/motivation for doing so would have been to provide minimum operating power loss with maximum power transfer between the automatic gain repeater circuit and subscriber loop while maintaining adequate transhybrid loss between the two directions of transmission and matching input impedance. Therefore, it would have been obvious to combine Shenoi with Hurst to obtain the invention as specified in claim 49.

Claims 15-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tambe (US 20020113649 A1) and Hurst (US 5422929) as applied to claim 14 above, and further in view of Shenoi (US 6507606).

As per claim 15 Tambe and Hurst disclose claim 14. Tambe and Hurst don't disclose that the DCP processes the sampled DSL signals to compute average power. Shenoi inherently discloses that the DCP processes the sampled DSL signal data to compute average power (figures 12 and 13, column 8 lines 57-67 and column 17 lines 46 to 60. The calculation of the average power is inherently in the calculation of the

spectral density and power control). Shenoi, Tambe and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the loop extender disclosed by Tambe with the loop extender disclosed by Shenoi. The suggestion/motivation for doing so would have been to adapt the amplification in both transmission directions (Shenoi abstract). Therefore, it would have been obvious to combine Tambe with Hurst to obtain the invention as specified in claim 15.

As per claim 16 Tambe and Hurst disclose claim 14. Shenoi inherently discloses that the DCP processes the sampled DSL signal data to compute peak power (figures 12 and 13, column 8 lines 57-67 and column 17 lines 46 to 60. The calculation of the peak power is inherently in the calculation of the spectral density and power control). Shenoi, Tambe and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the loop extender disclosed by Tambe with the loop extender disclosed by Shenoi. The suggestion/motivation for doing so would have been to adapt the amplification in both transmission directions (Shenoi abstract). Therefore, it would have been obvious to combine Tambe with Hurst to obtain the invention as specified in claim 16.

As per claim 17 Tambe and Hurst disclose claim 14. Shenoi inherently discloses the DCP processes the sampled DSL signal data to compute root-mean-square power (figures 12 and 13, column 8 lines 57-67 and column 17 lines 46 to 60. The calculation of the root-mean-square (rms) power is inherently in the calculation of the spectral

density and power control). Shenoi, Tambe and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the loop extender disclosed by Tambe with the loop extender disclosed by Shenoi. The suggestion/motivation for doing so would have been to adapt the amplification in both transmission directions (Shenoi abstract). Therefore, it would have been obvious to combine Tambe with Hurst to obtain the invention as specified in claim 17.

As per claim 18 Tambe and Hurst disclose claim 14. Shenoi discloses the DCP processes the sampled DSL signal data to compute power spectral density (figures 12 and 13, column 8 lines 57-67 and column 17 lines 46 to 60). Shenoi, Tambe and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the loop extender disclosed by Tambe with the loop extender disclosed by Shenoi. The suggestion/motivation for doing so would have been to adapt the amplification in both transmission directions (Shenoi abstract). Therefore, it would have been obvious to combine Tambe with Hurst to obtain the invention as specified in claim 18.

As per claim 19 Tambe and Hurst disclose claim 14. Shenoi inherently discloses a bypass relay for coupling the DCP to the bypass switches (column 8 line 57 to column 9 line 35). Shenoi, Tambe and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the loop extender disclosed by Tambe with the

loop extender disclosed by Shenoi. The suggestion/motivation for doing so would have been to adapt the amplification in both transmission directions (Shenoi abstract). Therefore, it would have been obvious to combine Tambe with Hurst to obtain the invention as specified in claim 19.

As per claim 20 Shenoi, Tambe and Hurst disclose claim 19. Shenoi inherently discloses the DCP upon receiving control signals from the central office controller, uncouples the amplification circuitry from the local loop by activating a deactivated bypass relay (column 8 line 57 to column 9 line 35). Shenoi, Tambe and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the loop extender disclosed by Tambe with the loop extender disclosed by Shenoi. The suggestion/motivation for doing so would have been to adapt the amplification in both transmission directions (Shenoi abstract). Therefore, it would have been obvious to combine Tambe with Hurst to obtain the invention as specified in claim 20.

As per claim 21 Shenoi, Tambe and Hurst disclose claim 19. Shenoi inherently discloses the DCP upon receiving control signals from the central office controller, uncouples the amplification circuitry from the local loop by activating a deactivated bypass relay (column 8 line 57 to column 9 line 35). Shenoi, Tambe and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the loop extender disclosed by Tambe with the loop extender disclosed by

Shenoi. The suggestion/motivation for doing so would have been to adapt the amplification in both transmission directions (Shenoi abstract). Therefore, it would have been obvious to combine Tambe with Hurst to obtain the invention as specified in claim 21.

As per claim 22 Shenoi, Tambe and Hurst disclose claim 19. Shenoi discloses that processing the control signals to select the DSL amplification circuitry for improving performance of the DSL amplification circuitry (column 8 line 57 to column 9 line 35). Shenoi, Tambe and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the loop extender disclosed by Tambe with the loop extender disclosed by Shenoi. The suggestion/motivation for doing so would have been to adapt the amplification in both transmission directions (Shenoi abstract). Therefore, it would have been obvious to combine Tambe with Hurst to obtain the invention as specified in claim 22.

As per claim 23 Shenoi, Tambe and Hurst disclose claim 19. Shenoi discloses that processing the sampled DSL signals to select the DSL amplification circuitry for improving performance of the DSL amplification circuitry (column 8 line 57 to column 9 line 35). Shenoi, Tambe and Hurst are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the loop extender disclosed by Tambe with the loop extender disclosed by Shenoi. The suggestion/motivation for doing so would have been to adapt the amplification in both transmission directions (Shenoi abstract).

Therefore, it would have been obvious to combine Tambe with Hurst to obtain the invention as specified in claim 23.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juan A. Torres whose telephone number is (571) 272-3119. The examiner can normally be reached on Monday-Friday 9:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad H. Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Juan Alberto Torres
06-07-2005

M. G

MOHAMMED GHAYOUR
SUPERVISORY PATENT EXAMINER